

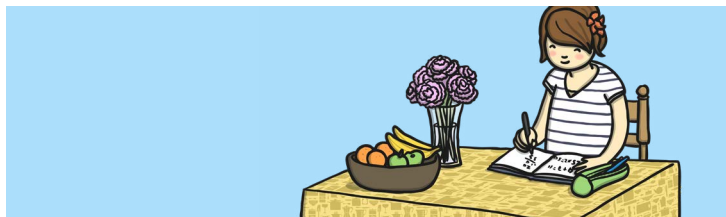
## Introduction

This 'States of Matter' unit will teach your class about the differences between solids, liquids and gases, classifying objects and identifying their properties. The children will work scientifically and collaboratively to investigate the weight of a gas. Furthermore, they will have chance to find the ideal temperature to melt chocolate. They will explore in-depth how water changes state, exploring melting, freezing, condensing as well as a particular focus on evaporation. Finally, they will learn about the stages of the water cycle, creating mini water worlds and an interactive water wheel to represent the different stages.



## Health & Safety

Ensure that children are aware that they should not drink the fizzy drinks in lesson 2, or eat the chocolate in lesson 3. Check any food allergies when selecting the fizzy drinks and type of chocolate to use. Ensure that any water used by the children is only warm, not hot, and is always 45°C or less. When demonstrating boiling water in lesson 4, ensure that this is only carried out by an adult and that children remain seated at all times. Make sure that the children do not place the salt and ice on their skin in lesson 4. When carrying out investigations ensure children are aware of how to use the equipment safely.



## Home Learning

**Crossword:** Children have the opportunity to use their knowledge of states of matter to solve a fun crossword puzzle.

**Water Cycle Game:** Children are challenged to use their understanding of the water cycle to play an exciting board game.



## Wider Learning and Weblinks

Book an educational visit from a United Utilities Education Officer to teach your class about how the water cycle impacts on them.

This [abpi website](#) is full of information and has several animations to demonstrate the properties of solids, liquids and gases and changes of state.

To look at all the resources in the States of Matter unit [click here](#).

To find out more about PlanIt download our [free guide here](#).

## Assessment Statements

By the end of this unit...

**...all children should be able to:**

- Sort materials into solids, liquids and gases.
- Explain that heating causes melting, and cooling causes freezing.
- Identify the melting and freezing point of water.
- Describe evaporation and condensation using practical examples.
- Describe the effect of temperature on evaporation referring to their investigation.
- Identify the stages of the water cycle.
- Predict what will happen in an investigation.
- Make observations.

**...most children will be able to:**

- Describe the properties of solids, liquids and gases.
- Explain that melting and freezing are opposite processes that change the state of a material.
- Identify the melting and freezing point of several different materials.
- Explain that heating causes evaporation and cooling causes condensation.
- Explain that evaporation and condensation are opposite processes that change the state of a material.
- Explain that the higher the temperature, the quicker water evaporates.
- Explain what happens to water at the different stages of the water cycle.
- Make observations and conclusions.
- Be able to answer questions based on their learning.

**...some children will be able to:**

- Explain the behaviour of the particles in solids, liquids and gases.
- Explain how heating and cooling causes materials to melt and freeze.
- Explain why a material's melting and freezing point is the same temperature.
- Explain how heating and cooling can cause materials to evaporate and condense.
- Explain why a higher temperature will speed up evaporation.
- Use the water cycle to explain why the water we have on Earth today is the same water that has been here for millions of years.
- Set up reliable and accurate investigations.
- Make and explain predictions.
- Make and record accurate observations.
- Use scientific language to explain their findings.
- Be able to ask and answer questions based on their learning using scientific language.

# Lesson Breakdown

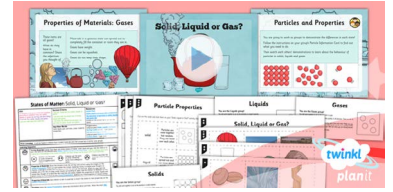
## 1. Solid, Liquid or Gas?

To compare and group materials together, according to whether they are solids, liquids or gases by sorting and describing materials into solids, liquids and gases.

- I can sort and describe materials.

## Resources

- Access to the Hall or an outside space



## 2. Investigating Gases

To compare and group materials together, according to whether they are solids, liquids or gases by investigating gases and their uses.

- I can investigate gases and explain their properties.

- Plastic bottle of lemonade - 1 per group
- 3-5 different fizzy drinks
- Digital weighing scales
- Beakers or plastic cups



## 3. Heating and Cooling

To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) by investigating how heating and cooling can change a material's state.

- I can investigate materials as they change state.

- Thermometers
- Foil pie tins
- Chocolate broken into equal sized squares
- Trays - 3 per group, each tray filled with a different temperature of water
- Stopwatches

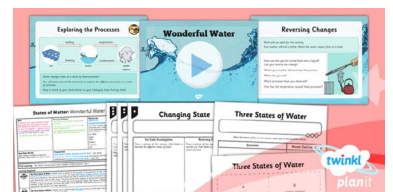


## 4. Wonderful Water

To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) by exploring how water can change its state to a solid, liquid or a gas.

- I can explore how water changes state.

- Container of warm water with cling film stretched over it
- Ice cubes
- Kettle
- Plate
- Beakers
- Teaspoon
- Salt
- Access to this ['Changing State' game](#)



## 5. Evaporation Investigation

To associate the rate of evaporation with temperature by investigating the effect of temperature on drying washing.

To make systematic, careful and accurate observations and measurements and report on findings from enquiries by displaying results and conclusions by investigating the effect of temperature on drying washing.

- I can investigate how water evaporates.

- Tea towels - 3 per group
- Water
- Measuring jugs - 1 per group
- Weighing scales - 1 set per group
- Three washing lines in places in different temperatures
- Pegs
- Thermometers - 1 per group
- Clock



## 6. The Water Cycle

To identify the part played by evaporation and condensation in the water cycle by creating a model of the water cycle.

- I can identify and describe the different stages of the water cycle.

- Clear plastic cups - 1 per pair
- Compost
- Cress seeds
- Cling film
- Access to this ['The Water Cycle' film](#)

